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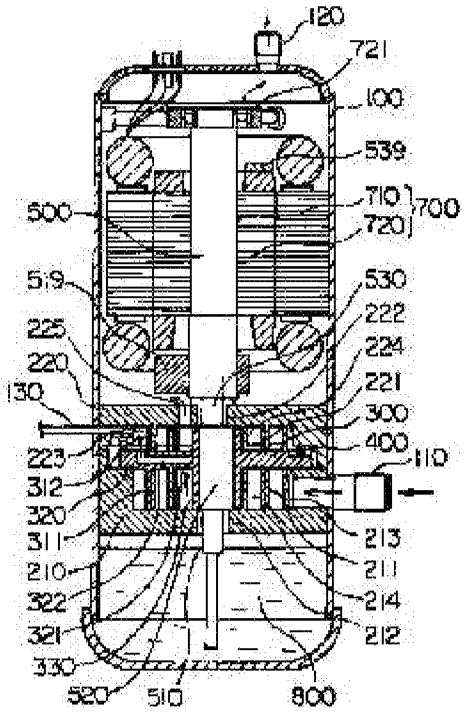
(54) SHAFT THROUGH TYPE TWO-STAGE SCROLL COMPRESSOR

(57)Abstract:

PURPOSE: To enable compression with high efficiency in a small-sized compressor, and to reduce the thrust force applied to a swivel scroll end plate from high pressure stage to low pressure stage.

CONSTITUTION: A crankshaft 500 is passed through a swivel scroll 300, laps 311, 312, the vortex shapes of which are symmetrical and the tooth heights of which are different are erected on both sides of the end plate, the pressure receiving surfaces of an upper compression space and a lower compression space are symmetrical, and the built-in compression ratios of both compression spaces are the same. Thus, a difference in load applied to the swivel scroll end plate is reduced, the pressure ratios of the first stage and the second stages are the same, a two-stage compressor is decreased in size, the efficiency is made highest, and a shaft is passed through the swivel scroll end plate to reduce the thrust force applied to the end plate.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]In the scroll compressor circled without a turning scroll rotating, a crankshaft penetrates a turning scroll and a fixed scroll, and this invention relates to the axial 2 steps of penetration scroll compressor it was made to make the efficiency in two-stage compression improve.
[0002]
[Description of the Prior Art]The mechanism which makes a turning scroll penetrate a driving shaft, forms a lap in the both sides of an end plate, forms compression space in each combining a fixed scroll, and is simultaneously compressed into a U.S. Pat. No. 3600114 specification using both compression space in parallel is shown. However, the example which carries out two-stage compression using the compression space of both sides in series is not shown by this example.
[0003]Although form a lap in the both sides of the end plate of a turning scroll at JP,5-60078,A, compression space is formed in each combining a fixed scroll, lower compression space is used as the first step of compressor and the structure which uses top compression space as the second step of compression space is shown, A bearing is in the lower part of an end plate, and has not penetrated the turning scroll. The scroll lap of the upper part and the lower part was different shape.
[0004]
[Problem(s) to be Solved by the Invention]It is when the pressure ratio of the first step compression zone and the pressure ratio of the second step compression zone are equal that the efficiency of a two-stage compressor becomes the highest. However, in the conventional method, since the lap shape of the upper part and the lower part differs, an upside built-in compression ratio differs from a lower built-in compression ratio, and the efficiency of a compressor does not become the highest. Since the center of an end plate of a turning scroll has not penetrated, the discharge pressure of a high-pressure stage will act on a center region, There was a problem that the load by differential pressure with the suction pressure which acts on a low pressure stage center region becomes large, a turning scroll will be forced on the low pressure stage side by strong thrust force from the high-pressure-stage side, sliding loss increases in respect of one side, a crevice arose in respect of another side, and leakage loss increased.
[0005]
[Means for Solving the Problem]In order to solve an aforementioned problem, an axial 2 steps of penetration scroll compressor by this invention, A fixed scroll member and a swing scroll member which uprighted a

spiral lap to an end plate, In a scroll compressor which opposes a lap mutually, carries out eccentricity, combines, makes it circle, without a crankshaft provided by penetrating a turning scroll and a fixed scroll rotating said swing scroll member, and compressed gas, For a turning scroll, both sides of an end plate upright a lap, and the first inhalatorium and the first compression space are formed in the first lap of one field combining the first fixing scroll lap, Form the second inhalatorium and the second compression space in the second lap of a field of another side combining the second fixing scroll lap, and in the center of an end plate of said turning scroll. Provide turning bearing which a turning drive axis penetrates, and in the center of an end plate of said first fixed scroll. Gas inhaled to the first inhalatorium by installing the first fixed bearing which supports one end of said driving shaft, installing the second fixed bearing which supports the other end of said driving shaft in the center of an end plate of said second fixed scroll, and carrying out the turning drive of said roll which circles is compressed by the first compression space, It is characterized by transporting gas which it finished compressing to the second inhalatorium, and repressing by the second compression space, and roughly, Make a turning scroll penetrate a driving shaft, eddy shape stands straight a lap with which depth differs by a symmetric figure on both sides of an end plate, and a receiving surface of top compression space and lower compression space is made into a symmetric figure, and a built-in compression ratio of both compression space is made the same.

[0006]

[Function]While a miniaturization becomes possible by making equal the pressure ratio of the first step compression zone, and the pressure ratio of the second step compression zone, efficiency of a two-stage compressor can be made into the highest, and the thrust force which acts from the high-pressure-stage side to the low pressure stage side is reduced by making a turning scroll penetrate a driving shaft.

[0007]

[Example]Hereafter, drawing 1 - drawing 13 explain the example of this invention.

[0008]Drawing 1 is a sectional view showing the entire structure of the first example of the encapsulated type scroll compressor of this invention. In the well-closed container 100, the compression zone which consists of the first fixed scroll 210, the turning scroll 300 which stood the lap straight on both sides of the end plate, and the second fixed scroll 220, the crankshaft 500 which drives the turning scroll 300, and the electric motor 700 for a drive are united, and are stored. The eccentric shaft 520 of the crankshaft 500 penetrates the turning scroll 300, The axis of both sides penetrates the end plate of the first fixed scroll 210, and the end plate of the second fixed scroll 220, respectively, The second medial axis 530 is supported by the 2 fixed bearing 222 provided in the end plate center section of the second fixed scroll 230 at the first fixed bearing 212 by which the first medial axis 510 was formed in the end plate center section of the first fixed scroll 210, respectively. The bearing 721 which supports the axis of rotation of the rotor 720 of the electric motor 700 is formed in the upper part.

[0009]The turning scroll 300 has rotation restrained by the rotation preventing mechanism 400 using an Oldham ring established between end plate 320 peripheral part by the side of the second lap of the turning scroll 300, and the second fixed scroll peripheral part, and a turning drive is carried out by rotation of the crankshaft 500 with the eccentric shaft 520. In order to negate the centrifugal force of the turning scroll 300 to the crankshaft 500 and to prevent generating of vibration, the first balance weight 519 and the second balance weight 539 are attached. Gas is inhaled from the suction pipe 110 in the first inhalatorium 213, and it is compressed by the first compression space 214 formed by the first fixed scroll 210 and the turning scroll

300, It is breathed out to the communicating path 322 provided in the turning scroll end plate from the first discharge opening 321 of the center section, and it is inhaled in the second inhalatorium 223 formed by the second fixed scroll 220 and the turning scroll 300, is compressed by the second compression space 224, and is breathed out in the well-closed container 100 from the second discharge opening 225. Then, gas is breathed out out of a well-closed container from the discharge tube 120.

[0010]So that minimum sealed volume just before one compression space in two or more first compression space 214 of a low pressure stage is opened for traffic to the first discharge opening 321, and maximum sealed volume in case the second compression space 224 of a high-pressure stage starts compression may become almost equal, The passage 322 which the laps 211 and 311 which form the first compression space, and the laps 221 and 312 which form the second compression space have the the same shape of a spiral type, is set up so that a depth ratio may become almost equal to the ratio of said minimum sealed volume to maximum sealed volume, and opens both ** for free passage is formed.

An upside built-in compression ratio and a lower built-in compression ratio are made the same.

[0011]An example of a two-stage compression refrigerating cycle is shown in drawing 2. The compressor 1000 consists of the first step compression zone 1010 and the second step compression zone 1020. Between the first step delivery 2 and the second step admission port 3, the gas inhaled from the first step admission port 1 inhales gas too much from the middle admission port 1800, and is breathed out from the second step delivery 4. Discharged gas passes along the four-way valve 1100, and passes and condenses the indoor heat exchanger 1200, and it decompresses by the first expansion valve 1300, and a mainstream refrigerant is further decompressed by the second expansion valve 1500, evaporates through the outdoor heat exchanger 1600, and is again inhaled by the compressor from the admission port 1 through the four-way valve 1100.Some refrigerants branch by the tee 6, are decompressed by the third expansion valve 1700, and reach the middle admission port 1800. Heat exchange of a mainstream refrigerant and the branched refrigerant of each other is carried out by the refrigerant heat exchanger 1400 in the meantime, it is cooled and a mainstream refrigerant is liquefied, and the branched refrigerant is heated, evaporates in part and serves as two-phases flow.

[0012]If the change of state of this cycle is expressed to a Mollier chart, it will become like drawing 3. A horizontal axis is the enthalpy per unit weight, and a vertical axis is a pressure. The gas inhaled from the first step of admission port 1 is compressed by the first step compression zone, the two-phases flow refrigerant of intermediate pressure is inhaled between the second step admission ports 3 from the first step delivery 2, enthalpy once decreases, and it is again compressed by the second step compression zone, and is breathed out from the second step delivery 4 to a cycle. The state in a cycle is shown by the same number corresponding to the position of 5-10 of drawing 2. There is little power of the compressor in this cycle in one step compared with the case where it compresses from the pressure of 1 to the pressure of 4, and it ends, and its efficiency improves. Efficiency becomes the highest when the pressure ratios from 1 to 2 and the pressure ratios from 3 to 4 are equal, and efficiency is made into the highest by [on which abbreviation etc. spread the pressure ratio of said 1st compression space, and the pressure ratio of the 2nd compression space] carrying out.

[0013]Since the second step of compression space is formed with the first step by both sides of the one turning scroll 300 according to the first example, a small lightweight two-stage compressor with a small path

can be realized, and efficiency is made into the highest by [on which abbreviation etc. spread the pressure ratio of the 1st compression space, and the pressure ratio of the 2nd compression space] carrying out. Since the first step and the second step of communicating path 322 were formed in the turning scroll end plate 320, piping for a free passage is unnecessary and structure becomes easy. In order that the upper-and-lower-ends side of an axis may be omitted, and may be and a pressure may act by penetrating the eccentric shaft 520 in the center section of the scroll compression zone, excessive thrust force stops acting on a scroll part. For this reason, the discharge pressure of the problem described by the paragraph of said technical problem, i.e., a high-pressure stage, will act on a center region, The problem that the load by differential pressure with the suction pressure which acts on a low pressure stage center region becomes large, a turning scroll will be forced on the low pressure stage side by strong thrust force from the high-pressure-stage side, sliding loss increases in respect of one side, a crevice arises in respect of another side, and leakage loss increases is solved. Making efficiency into the highest in the 1st example of the above by [on which abbreviation etc. spread the pressure ratio of the 1st compression space, and the pressure ratio of the 2nd compression space] carrying out, and by penetrating an eccentric shaft in the center section of the scroll compression zone, In order that the upper-and-lower-ends side of an axis may be omitted, and may be and a pressure may act, it is same also in each following example that excessive thrust force makes it not act on a scroll part.

[0014]Drawing 4 - drawing 7 are the figures showing the second example of this invention. Drawing 4 shows the whole sectional view. Drawing 5 is the sectional view of a compression mechanism part seen from the viewpoint of drawing 4, and a 90-degree direction. Drawing 6 shows an example of Oldham ring 400 which constitutes the rotation preventing mechanism used for this example. Drawing 7 shows an example of the turning scroll used for this example, the bearing, and the frame. The end plate 320 of a turning scroll has structure divided into the first end plate 320a with the first lap 311, and the second end plate 320b with the second lap 312. The first end plate 320a and the second end plate 320b have a very small crevice, sandwich Oldham ring 400 of drawing 6 in between, with the spacer 340, set an interval and are fixed. As for Oldham ring 400, the revolution side key 401 and the frame side key 402 are formed in annular body parts, such as a circle or an ellipse. At this time, the revolution side key 401 of Oldham ring 400 is inserted in the key groove 323 established in the end plate. Oldham ring 400 is movable in the direction of the key groove 323 between the first end plate 320a and the second end plate 320b.

[0015]As the frame side key 402 inserts each other's united turning scroll 300, Oldham ring 400, and frame 600 in the key groove 601 of a frame and they are shown in drawing 4 and drawing 5, It inserts between the first fixed scroll 210 and the second fixed scroll 220, and said 2 fixed scrolls are fixed to the frame 600. The first fixed scroll and the second fixed scroll pinch the frame of the cylindrical shape only whose very small size is thicker than the thickness of a turning scroll end plate, and are put together. The space between the first end plate 320a and the second end plate 320b is used also as the communicating path 322 which opens the first discharge opening 321 and the second inhalatorium 223 for free passage. The first balance weight 519 is formed in the first medial axis 510, and the second balance weight 539 is formed in the second medial axis 530.

[0016]Since the rotation preventing mechanism 400 was built in the end plate 320 of the turning scroll 300 according to the second example, it is not necessary to build a mechanism unrelated to compression into the field by the side of a lap and also and can miniaturize. Since the load concerning Oldham ring 400

becomes symmetrical thoroughly, power to which a ring is inclined does not occur. The balance weights 519 and 539 are formed in the both sides of the turning scroll, operation where the action was stabilized can be performed, reliability improves, and vibration and noise decrease.

[0017]The third example of this invention is shown in drawing 8. By this example, while changing a discharge route, the oil supply course to the bearing is shown. From the first medial axis 510, it applies to the eccentric shaft 520 and the oil supply passage 511 is formed. From this oil supply passage, the fill opening 522 is established for the fill opening 512 toward the turning bearing 330 toward the first fixed bearing 212.

[0018]The inside of the compressor container 1 is a discharge pressure, and its oil pressure in an oil tank is also a discharge pressure. Since the center chamber pressure of the first compression space is an intermediate pressure lower than a discharge pressure, an oil is refueled by the first fixed bearing 212 and the turning bearing 330 through the oil supply passage 511 and the fill openings 512 and 522 by differential pressure, respectively. The course of the gas from the first compression space to the second compression space is the same as the second example. The gas which the discharge passage 533 which leads to the second discharge opening is formed in the second medial axis 530, and was compressed by the second compression space 224 is led to the upper part in the well-closed container 100 through this passage, and is breathed out from the discharge tube 120. At this time, the oil contained in discharged gas is centrifuged by the trap 534, and is refueled from the feed hole 532 to the second fixed bearing 222. The antifriction bearing 721 supporting the axis of rotation of the rotor 720 of the electric motor 700 is installed in the upper bed of an axis, and lubrication is carried out by the oil mist contained in discharged gas.

[0019]According to the third example, even if it changes suction pressure and a discharge pressure quite sharply, Since centrifugal lubrication is carried out without not being based on pressure conditions but being drained to the second fixed bearing 222, since the oil supply differential pressure to the first fixed scroll bearing 212 always occurs, the oil refueled to the first fixed bearing 212 and turning bearing 333 joins and the trap 534 is passed, it is reliable.

[0020]The fourth example of this invention is shown in drawing 9. In this example, the compression zone which consists of the fixed scrolls 210 and 220 and the turning scroll 300 is installed in the upper part, and the electric motor 700 is installed in the lower part. The rotor 720 is attached to the first medial axis 510. The oil introducing pipe 540 is attached to the lower end of an axis. It applies to the fixed pivot 520 from the first medial axis 510, and the oil supply passage 511 is formed. The feed holes 512 and 522 are formed toward the first fixed bearing 212 and the turning bearing 330, respectively from this oil supply passage. The inside of the well-closed container 100 is a discharge pressure, and the upper bed of the first fixed bearing and the lower end of the turning bearing 330 are open for free passage to the center chamber of the first compression space 214.

Since it is an intermediate pressure, the oil 800 is refueled by each bearing by differential pressure.

The rotor-shaft carrier 721 which supports the axis of rotation of the rotor 710 of the electric motor 700 is installed, the feed hole 513 is formed toward this bearing, and it is supplied with oil by a centrifugal force.

The course of the gas from the first compression space of an oil supply passage to the second compression space is the same as the second example. The gas which the discharge passage 533 which leads to the second discharge opening is formed in the second medial axis 530, and was compressed by the second compression space 224 is led to the upper part in the well-closed container 100 through this passage, and is

breathed out from the discharge tube 120. At this time, the oil contained in discharged gas is centrifuged on the way, and is refueled from the feed hole 532 to the second fixed bearing 222.

[0021]Since force feed is possible also for the second fixed bearing 222 at the topmost part, plain bearing can constitute all the bearings from the fourth example. Since a compression zone is in the upper part, also when liquid cooling intermediation falls asleep in the well-closed container 100, a possibility of falling asleep even in compression space becomes small.

[0022]The fifth example of this invention is shown in drawing 10. The point that this example differs from the fourth example is a point that a center is positioned, by the turning bearing's 330a and 330b taking lessons from each, and equipping the common fixed pivot 520, while the turning scroll had been divided into 300a and 300b. As shown in drawing 11, there is no reference hole for positioning with the fixed scroll of the other party (hole) in the turning scroll end plate 320a, and it is [that the upheaval ring 350 for spacers is only formed in the end plate 320b, and]. Therefore, positioning of the diameter direction of a turning scroll is made by the physical relationship of a bearing and an eccentric shaft, respectively. Positioning of a hand of cut is also made by the physical relationship of ORUDAMUKI 410 and the key groove 323.

[0023]Since according to the fifth example there is no necessity of reworking and each parts of all can be beforehand incorporated at the time of an assembly after being crowded on both sides of Oldham ring 400 in the turning scroll end plates 320a and 320b, processing and an assembly become easy.

[0024]The sixth example of this invention is shown in drawing 12. The composition of scrolling is the same as that of the fourth example shown in drawing 9. If the shaft-orientations gas power by the side of the first compression space 214 of the turning scroll 300 and the shaft-orientations gas power by the side of the second compression space 224 are measured, the direction of the second compression space 224 side will be high voltage, and big shaft-orientations gas power will be generated. Therefore, although the turning scroll 300 is forced on the first compression space 214 side, the tip of the first fixing scroll lap 211 and the tip of the first lap 311 of the turning scroll 300 are stuck to the bottom of partner scrolling and a crevice is set to 0, Few crevices arise at the tip of the second fixing scroll lap 312, and the tip of the second lap 221 of the turning scroll 300. In this example, it has equipped with the tip seal 900 at the tip of the 2nd lap 221 of the turning scroll 300, and the leakage of this portion is prevented. Of course, if it equips with a tip seal also at the tip of the second fixing scroll lap 221, the effect of preventing leakage will become large.

[0025]Since the leakage between the second compression space can be made small according to the sixth example, performance of a compressor can be made higher.

[0026]The seventh example of this invention is shown in drawing 13. In the well-closed container 100 of suction pressure atmosphere, the compression zone which consists of the first fixed scroll 210, the second fixed scroll 220, and turning scroll 300 grade is installed in the upper part, and the electric motor 700 is installed by the lower part. The regurgitation covering 230 is put on the upper part of the second fixed scroll, the inside has become the regurgitation room 231, and it is [outside of a well-closed container] open for free passage with the discharge tube 230. The opening of the suction pipe 110 is carried out to the well-closed container 100, and inspired gas is drawn in a well-closed container. Then, after being introduced into the first inhalatorium 213 and compressed by the first compression space 214, it is introduced through the first delivery 321 and the communicating path 322 to the second inhalatorium, is compressed by the second compression space 224, is breathed out from the second delivery 225 at the regurgitation room 231, and is breathed out out of a compressor from the discharge tube 120. The oil pump 810 is attached to the lower

end of the crankshaft 500, and the oil 800 is refueled by each bearing through the oil introducing pipe 540 and the oil supply passage 511 within an axis.

[0027]According to the sixth example, since the inside of 100 in a well-closed container is suction pressure atmosphere, container thickness can be made thin and a weight saving can be carried out. Since the electric motor 700 is in a low temperature atmosphere, winding temperature is low, and reliability becomes high and copper loss also becomes low, it can be used in the state where motor efficiency is high.

[0028]

[Effect of the Invention]According to this invention, make a turning scroll penetrate a crankshaft, and eddy shape stands straight the lap with which depth differs by a symmetric figure on both sides of an end plate, and make the receiving surface of top compression space and lower compression space into a symmetric figure, and. Since the built-in compression ratio of both compression space was made the same, the load difference which acts on a turning scroll end plate can be made small, and the first step of compression ratio and the second step of compression ratio are made the same, each pressure ratio is made the same, as a two-stage compressor, it can do small and efficiency can be made into the highest.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]The entire structure sectional view of the encapsulated type scroll compressor of this invention
[Drawing 2]The figure showing an example of the two-step refrigerating cycle of this invention
[Drawing 3]The Mollier chart of the refrigerating cycle
[Drawing 4]The entire structure sectional view of the compressor of the second example of this invention
[Drawing 5]The fragmentary sectional view seen from the rectangular directions of drawing 4
[Drawing 6]Structural drawing of the Oldham ring of the second example of this invention
[Drawing 7]The turning scroll erection diagram of the second example of this invention
[Drawing 8]The entire structure sectional view of the third example of this invention
[Drawing 9]The entire structure sectional view of the fourth example of this invention
[Drawing 10]The entire structure sectional view of the fifth example of this invention
[Drawing 11]The turning scroll erection diagram of the fifth example of this invention
[Drawing 12]The turning scroll erection diagram of the sixth example of this invention
[Drawing 13]The entire structure sectional view of the seventh example of this invention
[Description of Notations]
100 -- Well-closed container 110 -- Suction pipe
120 -- Discharge tube 130 -- Injection tube
131 -- Injection mouth 210 -- The first fixed scroll
211 -- The first fixing scroll lap 212 -- The first fixed bearing
213 -- The first inhalatorium 214 -- The first compression space
220 -- The second fixed scroll 221 -- The second fixing scroll lap
222 -- The second fixed bearing 223 -- The second inhalatorium
224 -- The second compression space 225 -- The second discharge opening
300 -- Turning scroll 311 -- The first lap of a turning scroll
312 -- The second lap of a turning scroll 320 -- End plate
321 -- The first discharge opening 322 -- Communicating path
323 -- Key groove 330 -- Turning bearing
340 -- Pin 341 -- Hole
350 -- Upheaval ring 400 -- Oldham ring
410 -- ORUDAMUKI 500 -- Crankshaft

510 -- The first medial axis 511 -- Oil supply passage
512 -- Feed hole 519 -- The first balance weight
520 -- Eccentric shaft 521 -- Oil supply passage
522 -- Feed hole 530 -- The second medial axis
531 -- Oil supply passage 532 -- Feed hole
533 -- Discharge passage 539 -- The second balance weight
540 -- Oil introducing pipe 600 -- Frame
700 -- Electric motor 710 -- Stator
720 -- Rotor 800 -- Oil
900 -- Tip seal 1000 -- Compressor
1010 -- The low stage side compression zone 1020 -- The high rank side compression zone
1100 -- Four-way valve 1200 -- Indoor heat exchanger
1300 -- The first expansion valve 1400 -- Refrigerant heat exchanger
1500 -- The second expansion valve 1600 -- Outdoor heat exchanger
1700 -- The third expansion valve 1800 -- Middle admission port

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CLAIMS

[Claim(s)]
[Claim 1]A fixed scroll member and a swing scroll member which uprighted a spiral lap to an end plate, In a scroll compressor which opposes a lap mutually, carries out eccentricity, combines, makes it circle, without a crankshaft provided by penetrating a turning scroll and a fixed scroll rotating said swing scroll member, and compressed gas, For a turning scroll, both sides of an end plate upright a lap, and the first inhalatorium and the first compression space are formed in the first lap of one field combining the first fixing scroll lap, Form the second inhalatorium and the second compression space in the second lap of a field of another side combining the second fixing scroll lap, and in the center of an end plate of said turning scroll. Provide turning bearing which a turning drive axis penetrates, and in the center of an end plate of said first fixed scroll. Install the first fixed bearing which supports an end of said driving shaft, and in the center of an end plate of said second fixed scroll. An axial 2 steps of penetration scroll compressor transporting gas which compresses gas inhaled to the first inhalatorium by installing the second fixed bearing which supports the other end of said driving shaft, and carrying out the turning drive of said roll which circles by the first compression space, and finished compressing it to the second inhalatorium, and repressing by the second compression space.
[Claim 2]The axial 2 steps of according to claim 1 or 2 penetration scroll compressor whose minimum sealed volume of the first compression space and maximum sealed volume of the second compression space are almost equal.
[Claim 3]The axial 2 steps of according to claim 2 penetration scroll compressor with which the first fixing scroll lap and the second fixing scroll lap set up a ratio of depth so that vortical shape might become are a plane symmetry form and almost equal in minimum sealed volume of the first compression space, and maximum sealed volume of the second compression space.
[Claim 4]It is the axial 2 steps of abbreviation according to claim 1 penetration scroll compressor made equal about a pressure ratio of the first compression space, and a pressure ratio of the second compression space.
[Claim 5]The axial 2 steps of according to claim 1 penetration scroll compressor in which vortical shape is a plane symmetry form and the first fixing scroll lap and the second fixing scroll lap have a ratio of depth almost equal to a ratio of maximum sealed volume and minimum sealed volume of the first compression space.
[Claim 6]The axial 2 steps of according to claim 1 penetration scroll compressor having provided the first

discharge opening that emits gas compressed by the first compression space in an end plate of a turning scroll, and providing a communicating path which opens this discharge opening and the second inhalatorium for free passage in an end plate of a turning scroll.

[Claim 7]The axial 2 steps of according to claim 1 penetration scroll compressor establishing a rotation preventing mechanism within the limits of thickness of a turning scroll end plate.

[Claim 8]The axial 2 steps of according to claim 5 penetration scroll compressor two division was possible for a turning scroll within the limits of thickness of an end plate, and putting rotation preventing mechanism parts between these end plates so that field internal transmigration is possible.

[Claim 9]The axial 2 steps of according to claim 5 penetration scroll compressor which pinches a frame of a cylindrical shape only whose very small size is thicker than thickness of a turning scroll end plate, combines the first fixed scroll and the second fixed scroll, and is characterized by establishing a guide rail of a rotation preventing mechanism in this frame.

[Claim 10]The axial 2 steps of according to claim 5 penetration scroll compressor being shape characterized by comprising the following.

A key of a couple symmetrical with a point which a rotation preventing mechanism projects right-angled in a ring member of a circle or the shape of an ellipse in at least one ring face, and fits into a guide rail of a turning scroll end plate.

A key of a couple which projects radially in a position which shifted from this key 90 degrees, and fits into a guide rail of a frame.

[Claim 11]The axial 2 steps of according to claim 1 penetration scroll compressor having made flat a tip of the first lap of a turning scroll, and the first fixing scroll lap, and equipping both the second lap tip of a turning scroll, and second fixing scroll lap both [either or] with a sealing member.

[Claim 12]The axial 2 steps of according to claim 1 penetration scroll compressor comprising:

The bearing surface near high pressure atmosphere side shaft receiving end of the first fixed bearing which provided an oil supply passage crossed in the first medial axis and a fixed pivot from an oil sump side edge of a crankshaft and with which the first fixed scroll was equipped from this oil supply passage.

A feed hole which refuels the second fixed bearing in an oil which provided a feed hole which carries out an opening toward the bearing surface near high pressure atmosphere side shaft receiving end of turning bearing provided in a turning scroll, respectively, provided a gas passageway along which discharged gas of the second compression space passes in the second medial axis, and was centrifuged from this passage.

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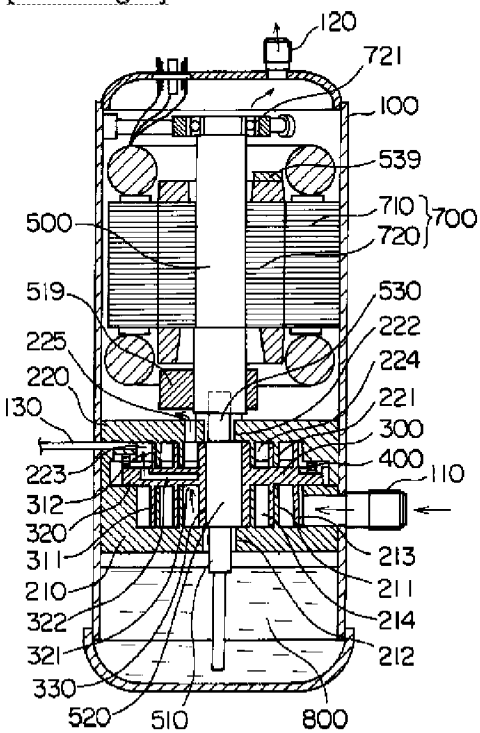
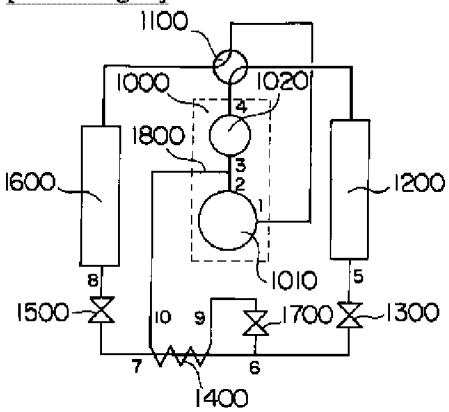
DRAWINGS

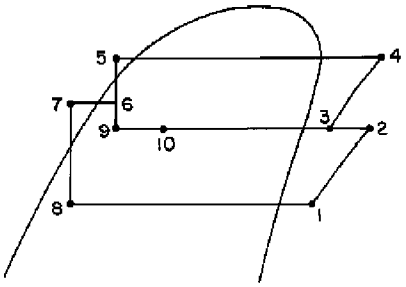
[Drawing 1]



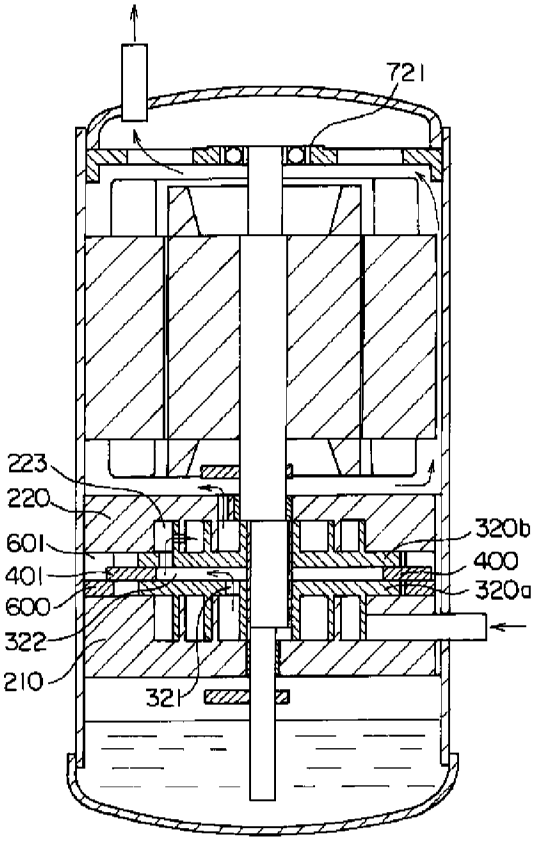
[Drawing 2]



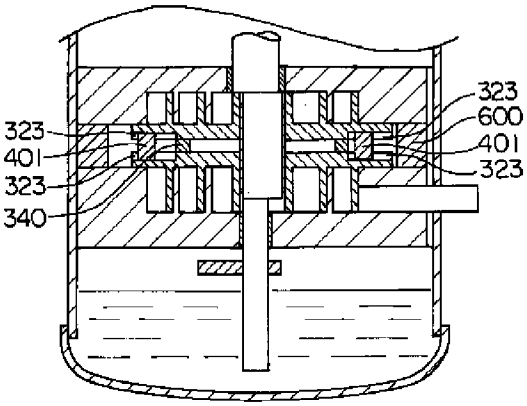
[Drawing 3]



[Drawing 4]



[Drawing 5]



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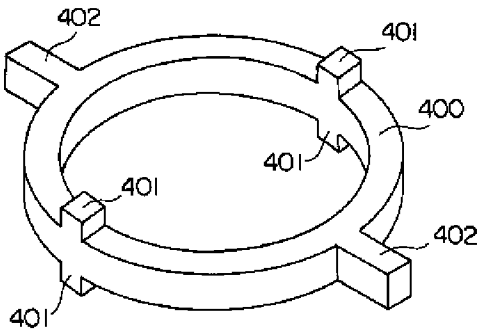

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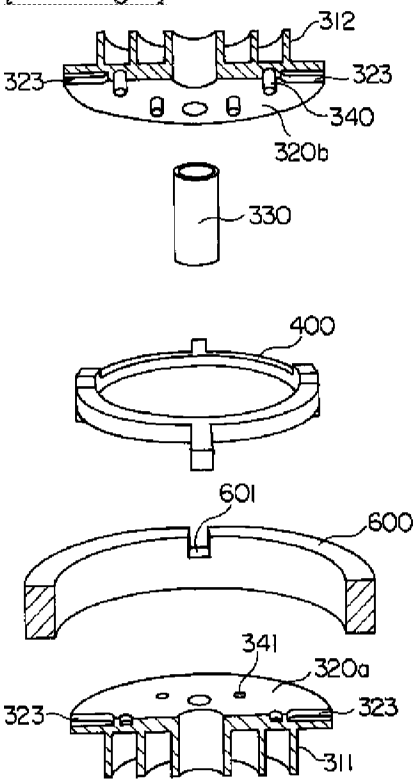

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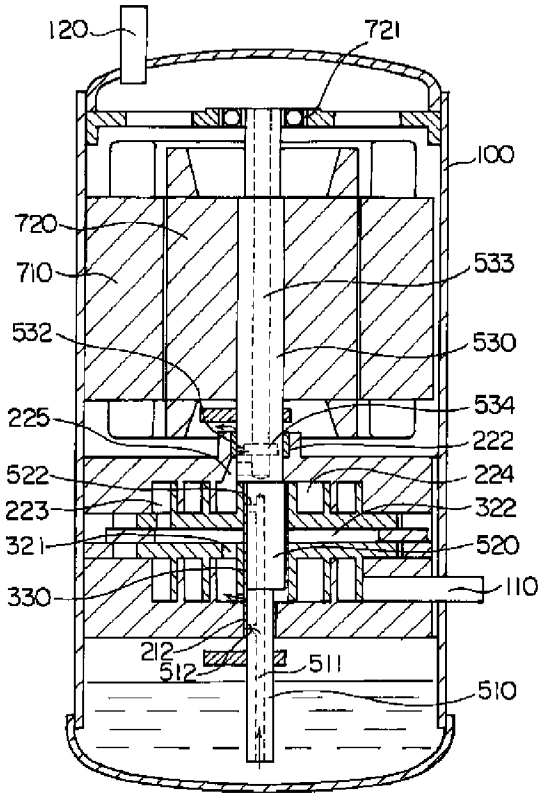
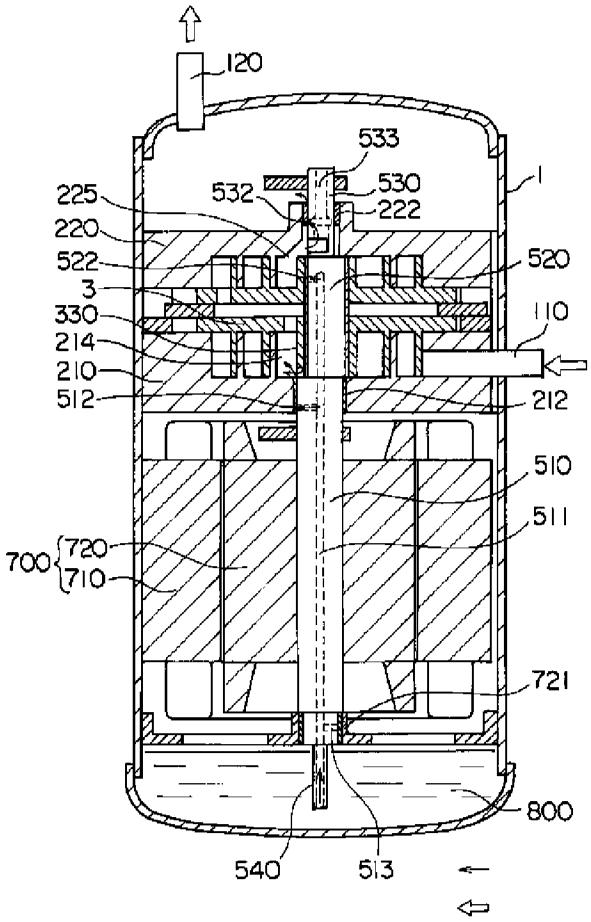
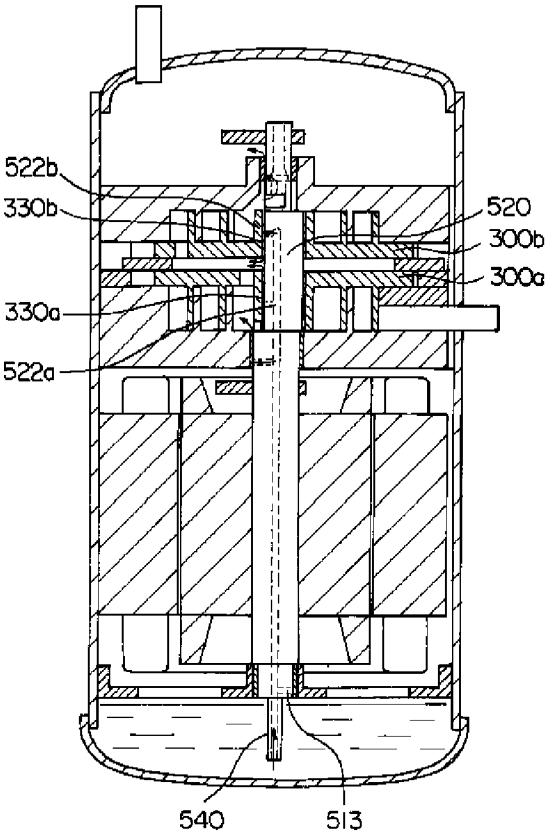


[Drawing 9]



[Drawing 10]



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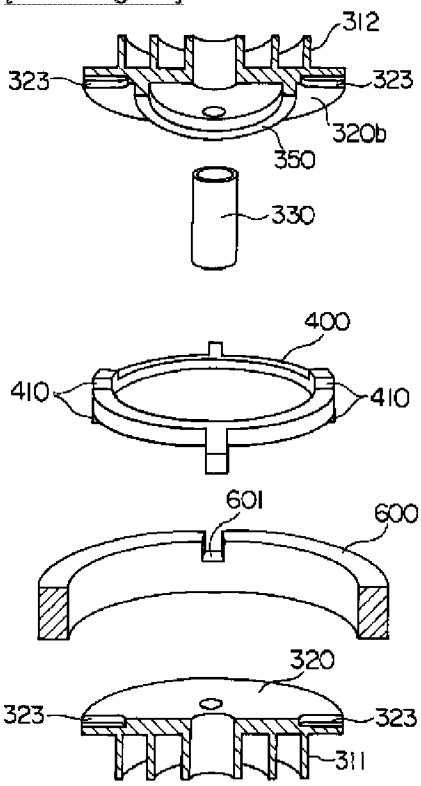
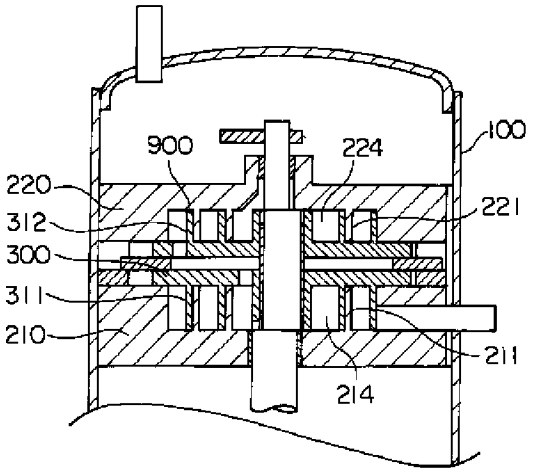
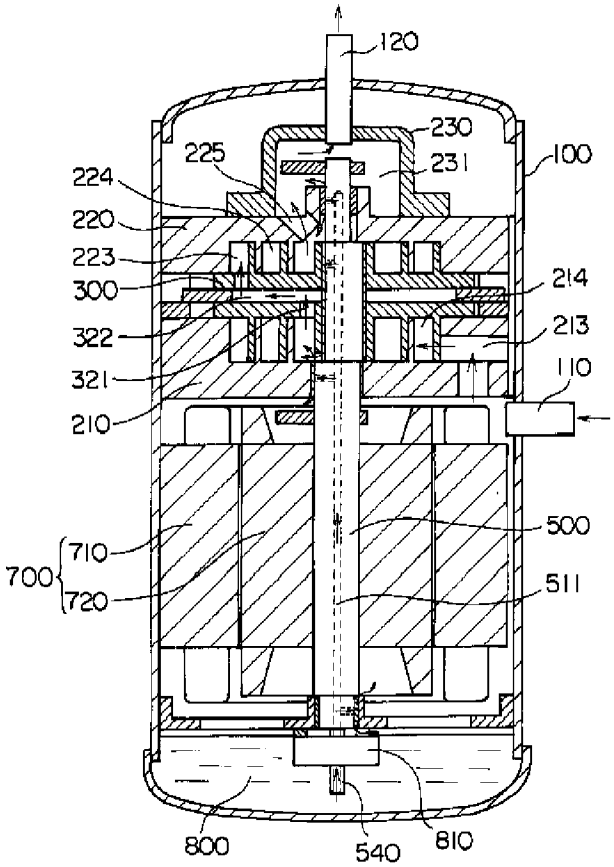


[Drawing 12]



[Drawing 13]



[Translation done.]